NASA Glenn Research Center
AEROSPACE Frontiers
Volume 4 Issue 3 March 2003

FY04 budget online

President Bush released the FY 2004 budget proposal on February 3.

This year, the Agency revised its mission to place a higher priority on research that focuses on NASA's capabilities aimed at strengthening America and addressing national needs. The President's proposal focuses on those areas that are unique to the Agency by investing in new technologies that will improve scientific return and efficiency; investing in environmental research and aviation technology to improve life on Earth; and by reducing overlap with other government agencies or commercial industry.

For an in-depth look at the Agency's proposed FY 2004 budget visit http://www.nasa.gov/about/budget/content/02_Agency_Summary.pdf. ◆

Architect adds form to structure

BY S. JENISE VERIS

NASA's Space Architect Gary Martin visited Glenn February 7 to describe his new role and the Agency's vision for the Integrated Space Plan (ISP). Although many at Glenn felt there was a strong possibility that Martin's visit would be cancelled due to the STS–107 *Columbia* tragedy, Martin felt the incident made the timeliness of his visit more important than ever.

Photo by S. Jenise Veris

Space Architect Gary Martin, right, accompanied by Sandra Reehorst, chief, Power and Propulsion Office, is welcomed by Glenn's Small Business Innovation Research Program Manager Walter Kim.

"We've made a huge investment in humans in space over the past 40 years—perhaps over $100 billion dollars," Martin said. "Putting a human on the Moon was the impetus for NASA. Now, just as the Agency has redefined itself as science-driven, the reason for humans in space is best defined as enablers of science and research."

Martin explained that the key reason for a human as opposed to a robot presence is the human brain, which is capable of discovery, response to unpredictable situations, or changes in course of action.

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Center Director Campbell honored

Center Director Donald Campbell (bottom, left) was among ten African Americans honored in Dominion East Ohio's prestigious 13th annual Strong Men and Women: Excellence in Leadership series. Dominion, in recognition of Black History Month, celebrated these trailblazers for their leadership and achievements in their professions and community service.

Inside

NASA forms Columbia Accident Investigation Board

While the NASA family and the entire world mourned the loss of our colleagues, NASA Administrator Sean O'Keefe quickly moved forward to announce the members of the Space Shuttle Mishap Interagency Investigation Board. This group will provide an independent review of the events and activities that led up to the tragic loss of the seven astronauts onboard the Space Shuttle *Columbia*.

Retired U.S. Navy Admiral Harold W. Gehman, Jr., chairs the panel. Gehman cochaired the independent commission investigating the attack on the U.S.S. Cole, Oct. 12, 2000, and served as the commander-in-chief of the U.S. Joint Forces Command.

"This panel is charged with a most difficult task, but I am confident in their ability, their integrity, and their dedication to doing what's right. Their findings will help push America's space program successfully into the future," said Administrator O'Keefe.

Other members of the investigative board include Rear Admiral Stephen Turcotte, commander, U.S. Naval Safety Center, Norfolk, VA; Major General John L. Barry, director, Plans and Programs, Headquarters Air Force Materiel Command, Wright-Patterson Air Force Base, OH; Major General Kenneth W. Hess, commander, Air Force chief of Safety, Kirtland Air Force Base, NM; Dr. James N. Hallock, Aviation Safety Division chief, U.S. Department of Transportation, Cambridge, MA; Steven B. Wallace, director of Accident Investigation, Federal Aviation Administration, Washington, DC; and Brigadier General Duane Deal, commander 21st Space Wing, Peterson Air Force Base, CO.

Admiral Gehman recently invited Dr. Shelia Widnall, a former secretary of the Air Force (1993 to 1997) and world-renowned expert in aircraft turbulence and spiraling airflow at the Massachusetts Institute of Technology to join the panel following an amendment to the Board's charter. The amendment provides additional flexibility in acquiring support staff and expertise outside of NASA. Administrator O'Keefe indicated the charter will continue to be updated as necessary to ensure the panel remains independent during the course of the investigation.

Several senior NASA leaders also are part of the panel, including G. Scott Hubbard, director, NASA Ames; Bryan D. O'Connor, NASA associate administrator and former astronaut, Office of Safety and Mission Assurance, Headquarters; and Theron Bradley, Jr., NASA chief engineer, Headquarters.

"NASA's internal investigation draws on the extensive expertise throughout the Agency. Public officials for NASA, the Federal Emergency Management Agency, and other Federal, state, and local entities are coordinating talents to help find the cause of this tragedy," Administrator O'Keefe said.

Additional information about the investigation and the STS-107 mission is available on the Internet at *http://www.nasa.gov* and *http://spaceflight.nasa.gov*. ◆

Educator Astronaut Program launched

Do you know an outstanding teacher? NASA is recruiting individuals with experience in K-12 education to join the full-time astronaut corps. Teachers can fill out an application online and students are encouraged to nominate those educators who have inspired and motivated them. Application and nomination forms as well as additional information are available at *http://edspace.nasa.gov* or by calling 1877-ED-ASTRO, or Glenn's Office of Educational Programs, 216-433-2957.

ISS science update

Science operations continue on the International Space Station. The Expedition Six crew is using the new equipment delivered by the Russian Progress resupply ship and completing experiments in biology, physics, chemistry, ecology, medicine, materials science and manufacturing, and studying the long-term effects of space flight on humans.

Commander Ken Bowersox, pictured jogging at right, is the astronaut assigned to wear the Lower Extremity Monitoring Suit designed to measure forces on the feet, joint angles, and muscles during everyday activities in zero gravity as part of the FOOT/Ground Reaction Forces During Spaceflight (FOOT) experiment.

Photo coutesy of NASA/JSC

In addition to shedding significant new light on the reasons for bone and muscle loss during space flight and on the design of exercise countermeasures, FOOT could help in the prevention and treatment of osteoporosis on Earth. ◆

Director's Corner
With Donald Campbell

Exciting times lie ahead

The Commission on the Future of the U.S. Aerospace Industry contains several recommendations for revitalization of the aerospace industry. They include research that will enable breakthroughs in aerospace capabilities to be the global leader in the 21st Century. This is in concert with our aeronautics program at Glenn.

In the FY 2004 proposed budget request, President Bush places high priority on investments in key power, propulsion, and communications technologies, and human research to improve the efficiency and scientific return of exploration in space. Glenn's research base includes power, propulsion, and communications. Most recently, there has been a transition for the microgravity program to focus on biomedicine and bioengineering.

Two new initiatives—Project Prometheus and Optical Communications—will offer opportunities to tap into Glenn expertise. In the areas of power and propulsion, Project Prometheus falls under the Nuclear Systems Initiative, which was introduced in FY 2003, and includes the first nuclear-electric flight mission called the Jupiter Icy Moon. This project will enable unprecedented science data return through high-power science instruments and advanced communications technology. The Jupiter Icy Moon Orbiter will search for evidence of global subsurface oceans on Jupiter's three icy Galilean moons. This mission sets the stage for the next phase of exploring Jupiter and will open the rest of the outer solar system to detailed exploration.

The Optical Communications initiative offers potential for great improvements in communication data rate. For example, using conventional radio frequency communications, the Mars Reconnaissance Orbiter will take 21 months to map 20 percent of the surface of Mars. However, using optical communications will allow the entire surface to be mapped in 4 months. While critical technology exists, it must be demonstrated. This project promises dramatic reduction in cost per byte of data returned and could replace the Deep Space Network.

The President's FY 2004 budget request places great confidence in NASA. The two initiatives outlined here and others will offer exciting opportunities for our employees. There is relevance and guidance for the aeronautics and space programs at Glenn. Let's get to work and make the Agency proud! ◆

News Notes

LABORATORIES OPEN HOUSE: Five laboratories in have been refurbished to address NASA's future battery and fuel cell system requirements. Employees are invited to view the laboratories during an open house on March 18. Self-guided tours are scheduled from 9 a.m. to 4 p.m. with guided tours offered at 10 a.m. and 1 p.m.

HARVEST FOR HUNGER: Glenn is sponsoring its annual Harvest For Hunger drive through March 31. Last year the Center collected 2,500 food items (food and cash equivalents). Nonperishable food item drop-offs are located in the main lobbies of buildings Cash donations can be dropped off in the For further information, contact Gregory Bobbit, 216–433–6191.

BPW MEETING: The Glenn Business Professional Women (BPW) monthly meeting will be Tuesday, March 18, in the at 11:30 a.m. In recognition of Women's History Month, the meeting will feature a panel discussion consisting of several successful Glenn women who will talk about and answer questions concerning their careers. There will also be a short video with this year's theme "Women Pioneering the Future." For information and reservations, contact Erline Trsek, 216–433–9394.

AFGE MEETING: AFGE Local 2182 will hold its next monthly membership meeting at 4:30 p.m. on Wednesday, April 2, at the Clifton on Brookpark Road and West 220th Street.

LESA MEETING: LESA/IFPTE, Local 28, will hold its next monthly membership meeting on Wednesday, April 9, at noon in the

GOLFERS WANTED: NASA Sunshine (Mixed) Golf League is accepting new members for their Thursday league at Play nine holes with tee times at 4 to 5 p.m., April 24 to September 11. Spouses and retirees are welcome. Dues are $30. For more information, contact Donna Clements, 216–433–3566.

Exchange Corner

● Celebrate St. Patrick's Day, Monday, March 17, with a corned beef lunch special served in the from 11 a.m. to 2 p.m.

● Arks-N-Barks, a company that specializes in animal giftware for people, will hold a sale in the upper section of the on Wednesday and Thursday, March 19 and 20, from 10:00 a.m. to 2:30 p.m. Needlepoint, cookie jars, flags, stationary, mouse pads, cat and dog toys, and much more will be available.

Architect lays groundwork for future missions

Continued from page 1

These cognitive skills are not available in robots.

The ISP will complement the governing NASA Strategic Plan and will provide a conceptual view of what is needed to lay groundwork for future space missions. The plan incorporates goals, science drivers, and a combination of technology and program road maps to determine the kind of capabilities we need to reach desired metrics. The ISP will provide the basis for future Agency investments.

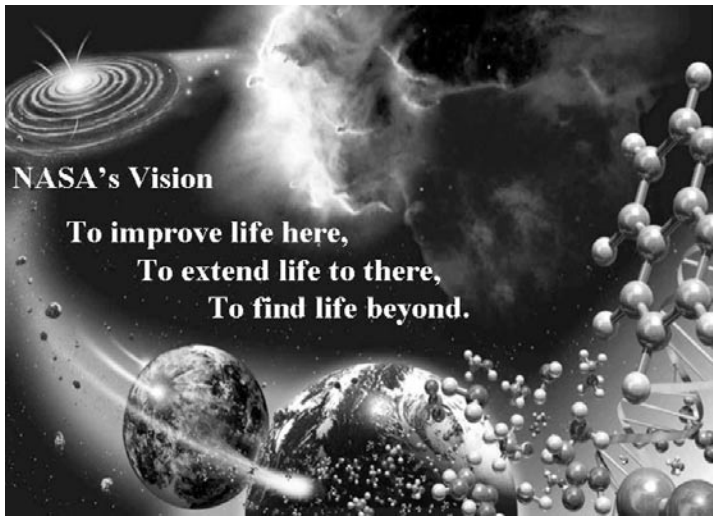
The top new initiatives the Agency has chosen for strategic investment to expand human capabilities with broad applications for all the Enterprises include affordable and abundant power and propulsion, efficient and safe human research, advanced communications, and education.

"By developing these areas, we're building a progressive capability that will keep opening doors to new technology," Martin said. "We want to marry all of these pieces together to create a unified vision to define our goals."

Martin meets with Enterprise associate administrators on a regular basis and travels to centers to help determine future technology requirements. He also monitors development programs to ensure readiness and support of next-generation science objectives. He then reports back to NASA's Joint Strategic Assessment Committee, which is responsible for making recommendations to Administrator Sean O'Keefe.

Due to a limited staff of five detailees, Martin relies on the people, skills, facilities, and analysis performed at the field centers and coordinated by center leads for his data. Center Director Donald Campbell has appointed Sandra Reehorst, chief, Power and Propulsion Office, as Glenn's lead.

Reehorst said that her initial efforts to assist Martin would be concentrated in three areas: providing input to NASA Langley drafting the ISP; providing support to NASA Marshall coordinating space transportation studies and activities such as assessments of *Earth to Orbit* and *In-Space* options; and providing support for existing architectural studies led by NASA Johnson.



The funding for the Space Architect activities comes from five NASA Enterprises—Human Exploration and Development of Space, Space Science, Earth Science, Biological and Physical Research, and Aerospace Technology.

"By creating the ISP, we're building an architecture that is flexible, sustainable, and progressive," Martin explained. "We're not just going to Mars or the Moon and then figuring out what we'll do when we get there. We're doing an activity that begins with robots and follows with humans performing science-driven missions to meet the goals of our Agency." ◆

CFC 2002 exceeds goals

Center Director Donald Campbell and the 2002 Combined Federal Campaign (CFC) Committee express their appreciation to the Glenn community for its generous contributions to the 2002 CFC. Glenn's commitment to the greater Cleveland community allowed the Center to exceed its goal of $357,000—with a total of $385,862 and 57 percent participation. Employees showed an excellent turnout for the CFC Ice Cream/Car Show Social, where many people expressed their enthusiasm and stated their support for continuing this mid-campaign event in the future. This year's campaign allowed Glenn to show its commitment and leadership in the Federal community as well as a pioneering spirit as the first Federal agency to use a Web-based donation program. Forty-five percent of the amount donated ($175,116) was pledged via a United Way modified program for Glenn CFC. The Center's success has started a trend in the Northeast Ohio Region for all agencies to offer this Web-based program next year.

Women's History Month spotlight

The thrill of research

BY DOREEN B. ZUDELL

Photo by Doreen Zudell

Kim de Groh, right, shares the joy of research with students from Hathaway Brown High School, left to right, Maura Lillis, Allison Rapport, and Christiane Youngstrom. The students come to Glenn weekly to conduct various experiments under de Groh's guidance.

Kim de Groh, Electro-Physics Branch, knew the value of *inspiring the next generation of explorers* long before it became part of NASA's formal mission statement. For the past 14 years, she has incorporated mentorship into her career as a materials research engineer, sharing the joy of exploration and discovery with young people.

"It's important for students to gain experience in a particular field to see if they enjoy that type of work," de Groh explained. "I was fortunate to have a summer job at Glenn during graduate school, which convinced me that I love doing research. I truly enjoyed the environment and the people here. This opportunity made me determined to get a permanent job at NASA."

Now, 17 years later, de Groh is recognized as a technical leader and author of 67 publications. She has made significant contributions to NASA missions, having direct impact on the Hubble Space Telescope program and development of durable heat receiver coatings for solar dynamic power systems. She has also received numerous awards for technical contributions including NASA's prestigious Space Flight Awareness Honoree award, Cleveland Federal Executive Board's Wings of Excellence award, Glenn's Federal Women's Program award, and Best Paper awards from the American Society of Materials Engineers and the American Institute of Aeronautics.

While de Groh is well known for her technical contributions, she is also valued as a positive role model to students with an interest in science and research. Over the years she has worked with 6th grade through college-level students in such activities as the Girl Scouts Mentor-Net, OAI summer internships, and the Cuyahoga Community College Women in Career workshop. These experiences have showed her that mentoring is a "win-win" situation.

"I benefit by gaining help on research projects, students grow technically and personally in their level of confidence, and my Branch benefits from added research productivity and exposure to the abilities of potentially future employees," she explained.

Not surprisingly, one of de Groh's most enjoyable contributions to the field of materials is as Glenn's principal investigator for the Polymer Erosion and Contamination Experiment (PEACE)—an activity with mentoring as a key component. This space flight experiment will study chemical contamination from silicones and atomic oxygen erosion of polymers. Working on this project has enabled her to collaborate with students from Hathaway Brown High School in Shaker Heights, OH, since 1998.

Currently 5 girls are in the PEACE program. Eight PEACE alumnae are now attending various universities in pursuit of degrees. While many high school students head for the mall on Friday afternoons, these students come to Glenn to conduct various experiments such as condensation studies of salt-sprayed polymers and atomic oxygen erosion while under de Groh's guidance.

"Kim is great to work with because she explains the processes in a way that we can understand, yet she doesn't treat us like children," said Maura Lillis, a Hathaway Brown junior. "She sees us as equals in the project and welcomes our contributions."

In January 2001, PEACE became part of the Materials International Space Station Experiment (MISSE), which includes 41 polymer samples from PEACE research. Dubbed MISSE 1 and 2, the experiment was part of the STS-105 payload delivered to and placed on the external surface of the International Space Station in August 2001. De Groh was recently informed of approval to fly 60 additional polymers on a future MISSE mission.

Perhaps the most valued benefit of de Groh's mentoring experiences go beyond technical accomplishments. Whenever possible, she shows students she cares about them as individuals by attending graduation ceremonies and school-based competitions or writing letters of recommendation.

De Groh affirmed, "Making friends and enjoying the companionship of young people is one of my greatest rewards. Some of my closest friends are students that I worked with years ago. Knowing I have had an impact on someone's life and career is extremely rewarding." ◆

Centennial staffing plan takes flight

Glenn's Ad Bldg Auditorium recently buzzed with activity during the Centennial of Flight Staffing Fair. More than 150 employees had great fun as they mingled and enjoyed refreshments, had their photos taken as astronauts, chatted with Orville and Wilbur Wright as they explained their 1903 Wright Flyer, and took home Inventing Flight door prizes. But the fair was just the beginning of Glenn's employee involvement in Centennial events. People learned how to use the new online staffing registration Web site, which received impressive employee use in its premier week of availability. Committee leads received names of interested individuals and have begun contacting them to form teams.

C-2003-307 Photo by Marvin Smith

Centennial Timeline/Web site subcommittee cochairs Bonita Smith (IDI/0620) and Susan Hennie (0100) discuss the online history database—Glenn's new research, education, and entertainment resource—with a potential staffer during the staffing fair.

"We've received tremendous interest in the Centennial, but need employee commitment to ensure an impressive Glenn presence at all activities," said Rhonda Holstein, lead, Staffing Committee. "Inventing Flight will require all of our combined efforts to make it a success."

Glenn plays the largest Agency role for Inventing Flight in Dayton, OH, in July, but is also participating in national Centennial of Flight activities including the Festival of Flight, Fayetteville, NC; AirVenture 2003, Oshkosh, WI; L.A. County Fair, Los Angeles, CA; ShoreFest, Long Beach, CA; and EAA First Flight Celebration, Kitty Hawk, NC.

Employees who could not make it to the Staffing Fair can still join Glenn's team and work at these historical events by registering on the Centennial Web site, *http://centennial.grc.nasa.gov/index.cfm?fuseaction=REGISTER.home*. ◆

In Appreciation

Many thanks for all the kind expressions of sympathy and comfort following the December 21 death of Karen's father.

—Karen and Daryl Edwards

Thank you to all my friends at Glenn who participated in my retirement activities. You left me with many great memories that I will always treasure.

—Larry Bober

Retirements

James Biaglow, On-Board Propulsion Branch, retired January 3, 2003, with 36 years of NASA service.

Joseph Gaby, Turbomachinery and Propulsion Systems Division, retired January 3, 2003, with 40 1/2 years of service.

Wayne Girard, Aeropropulsion Procurement Branch, retired January 3, 2003, with 19 1/2 years of service.

Michael Hosler, Office of the Chief Financial Officer, retired January 3, 2003, with 13 years of NASA service.

Laurence Heidelberg, Structures and Acoustics Division, retired January 31, 2003, with 40 1/2 years of NASA service.

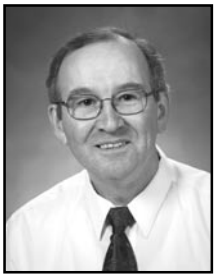
Thomas Jacobson, Microgravity Science Division, retired January 31, 2003, with 41 1/2 years of service.

Heidelberg

Jacobson

Biaglow

Gaby



Girard

Hosler

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DEADLINES: News items and brief announcements for publication in the April issue must be received by noon, March 14 . The deadline for the May issue is noon, April 11. Submit contributions to the editor via e-mail, doreen.zudell@grc.nasa.gov, fax 216–433–8143, phone 216–433–5317 or 216–433–2888, or
Ideas for news stories are welcome but will be published as space allows. View us online at http://AeroSpaceFrontiers.grc.nasa.gov.

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People

Appointments

Saldana

Needham

Rudolph Saldana will serve as acting director of Space until the position, vacated by Gerald Barna on January 3, is filled. Saldana had previously worked in this capacity while Barna served as acting deputy director from August 1999 to July 2002.

Kathy Needham has been selected as team lead in the Commercial Technology Office (CTO). In this role, she coordinates the efforts of the Office of Intellectual Property Management and External Agreements. This position will help the Center increase its reimbursable funding and patent licensing royalties. Needham's past efforts in CTO have resulted in significant improvements to the Space Act Agreement process at the Center and across the Agency.

Fisher

Nancy Fisher was recently named director of Lewis Little Folks, Inc., Glenn's onsite daycare center. Fisher has more than 30 years of experience in public education, both in the classroom and in administration. She holds a bachelor's degree in education from the University of Akron and a master's degree in education from Ashland University.

Honors

Michelle Manzo, Thermal-Mechancial Systems Branch, has received *Design News'* Women In Engineering Achievement award, which includes a $20,000 grant to be given to Manzo's school of choice. Manzo has chosen Case Western Reserve University's Yeager Center for Electrochemical Sciences as the recipient. Manzo is being recognized for her research in improving the life and performance of batteries for aerospace applications and leadership in developing advanced nickel-hydrogen batteries.

Manzo

In Memory

Daniel Keliher, 76, who retired in 1994 with 32 years of service, recently died. Keliher joined NASA in 1962 as chief of the Construction Branch. He was named chief of the Facilities Engineering Division in 1974 and worked in that capacity until his retirement.

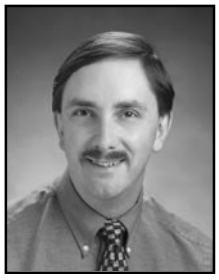
Mary Caroline Kocher, 81, who was employed at Plum Brook Station during World War II, recently died.

June Masek, 83, who retired in 1978 with 23 years of service, recently died. She was a clerk-stenographer during the early NACA/NASA years.

Behind the Badge

a closer look at our colleagues

Marvin Smith



Job assignment: The greatest job at Glenn—still imaging specialist, aka photographer (InDyne, Inc.). If it's cool and important at Glenn, we photograph it. I don't think that anyone sees more of the Center than those who have carried a camera through every building.

Time at NASA: 17 years

Hometown:

Describe your family: I have been genuinely blessed with a wonderful wife, Carol, and the best four kids on the planet. Matthew is 11. He is a deep thinker and lives for rules, numbers, and baseball. Danny, 9, is the source of almost every kid story that I share with anyone who knows me. He is an inventor, perpetual motion machine, engineer to the core, artist, and the most generous human I know. Seven-year-old Erik loves practical jokes, basketball, and picking on his sister. His dream is to someday become a firefighter. Elizabeth is 5 and all girl. Her world revolves around dolls, girlfriends, anything pink, and giving and getting a hug.

Career alterative: If I were to change careers today, I would probably go into marketing and communications.

Person you most admire: So many people have been rudders in my life, most without even knowing it. Anyone who has courage for convictions, is quick to praise and slow to criticize, and is willing to sacrifice for his or her family has my vote. I grew up thinking that my dad was too cheap to buy anything that you could not find at Value City. The day that I found out that, as a single man, he bought Nun Bush shoes and dreamed of owning a Cadillac, I realized that his thrift was all because of his six boys.

Activities when away from NASA: I am at the stage of my life when everything revolves around my kids. I am a cubmaster of my boys' Cub Scout Pack. Four kids were not enough. Now I have 35.

What do you see as an area of expertise at NASA: NASA has genuinely earned its reputation for thinking outside the box as only NASA can. That quality can only come from talented, freethinking folks who constantly push the envelope.

Calibration Laboratory measures up to standards

BY S. JENISE VERIS

Glenn's Calibration Laboratory's expertise in precision testing and measurement was confirmed during a recent interlaboratory comparison of voltage measurement sponsored by the National Conference of Standards Laboratories International.

Glenn was among 16 institutions that participated in a weeklong exercise requiring them to use the 10-Volt Josephson Junction Voltage Standard (J-Volt) to perform measurements on instrumentation. Participants included laboratories such as the National Institute of Sciences and Technology, the National Research Council of Canada, and Sandia National Laboratories.

Metrologists Allen Bare and Carl Attinoto, IDI, Logistics and Technical Information Division, conducted the testing in Glenn's Primary Electrical Laboratory.

"We used the NASA-owned and shared portable packaged J-Volt, a state-of-the-art device that enabled us to calibrate our Lab reference voltage standards," Bare explained. "By using the J-Volt, we're able to reduce the measurement of uncertainty (or trace the margin for error) to within $1/10^{th}$ of a part per million for the 10-volt DC reference voltage at Glenn. Participation in the interlaboratory allowed us to show agreement between our measurement and those at the pivot lab, Sandia National Laboratory, to within 100 nanovolts (100×10^{-9})."

Metrology services at Glenn include the inspection, repair, calibration, and maintenance of instrumentation used for test and measurement. The benefit of having a portable J-Volt is the ability to calibrate in-house without carrying an instrument off lab and risking damage in transportation, plus there is less down time.

"We have to be meticulous in our calibrations because it affects the work of others," Bare added. "Technicians, researchers, or scientists, who have to use measurement devices, rely on our precision to record data in the field." ◆

Photo by S. Jenise Veris

Carl Attinoto (left) and Allen Bare review their portfolio on the J-Volt portable package maintained in the Primary Electrical Lab.

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